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Ministry
of the
Environment

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FACTS

FOR ENVIRONMENTAL STUDIES

Investigating Your Environment

A LESSON PLAN FOR A LAND USE SIMULATION GAME

Set the stage for this investigation by reviewing quickly what will take place in the allotted time. For example: "During this investigation we are going to participate in a simulation game concerning land use in a hypothetical community, analyze what we have done, and present some ideas which will enable you to develop your own simulation game based on local environmental issues or concerns." The techniques used in simulation games combine elements of simulations, games, and role-playing. Students assume the roles of decision-makers in a simulated environment and compete for certain objectives according to specified procedures and rules. (Note to teacher: Use as much of the information about simulation games included below as needed. This will depend on how familiar participants are with this type of activity.)

Some Information About Simulation Games (Use as needed to set stage.)

Simulations are operating models of real life situations. They may be about physical or social situations. Most simulations for classroom use involve *role-playing*—the roles being acted out to correspond to the functioning of some real process or system.

Most simulations for classroom use involve *gaming*. A game is defined as something enjoyable—however serious it might be—involving competition for specified objectives and observing rules.

Some simulation games are based on environmental issues. What are some benefits of using simulation games as an instructional technique for investigating environmental problems?

They're fun.

They get people involved.

They are a logistically easy way of helping to prepare people for becoming involved with solving environmental problems.

People analyze cause-and-effect relationships of environmental issues.

People are put in role-playing situations where they have to suggest alternative solutions to environmental concerns.

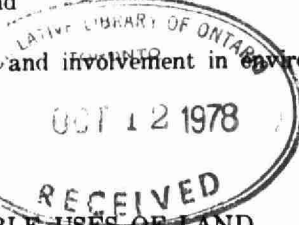
People are forced to evaluate the consequence of decisions in discussion or on paper before these decisions are carried out in reality.

People interact with each other in the *decision-making* process.

So . . . simulation games not only:

develop understandings about problems in the environment and
develop awareness and concern about those problems,

But they help people develop skills they need for citizen action and involvement in environmental management.



I. INFERRING, RECORDING AND CLASSIFYING POSSIBLE USES OF LAND

Discussion:

A. Distribute TASK A, Centerplace City Land Use Problem.

B. The problem to be decided is what are some possible uses for the one-square mile (640 acres) of county farmland, four miles northeast of the city. It is now available for the city's use.

This lesson plan was originally prepared by the U.S. Dept. of Agriculture, Forest Service, Environmental Education Branch, Washington, D.C. 20250, and appeared in the publication "Teaching Materials for Environmental Education".

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TASK A: (10 minutes) Work by yourself.

Read the background information for Centerplace City, and then list some possible uses of the vacant farmland.

"One square mile of unused county farmland, four miles northeast of the city is now available for the city's use."

Background Information Sheet: Centerplace City

The population is 250,000 and rapidly increasing.

The city's boundaries are being extended, but the suburban fringe is expanding even more rapidly.

The rapid population growth is accompanied by demands for more housing, more jobs, additional city services, and recreational areas.

The power for industrial uses, adequate public transportation, and a skilled labor force are available.

The city is located near forests, which are to the north.

The land to the east is devoted mainly to farming.

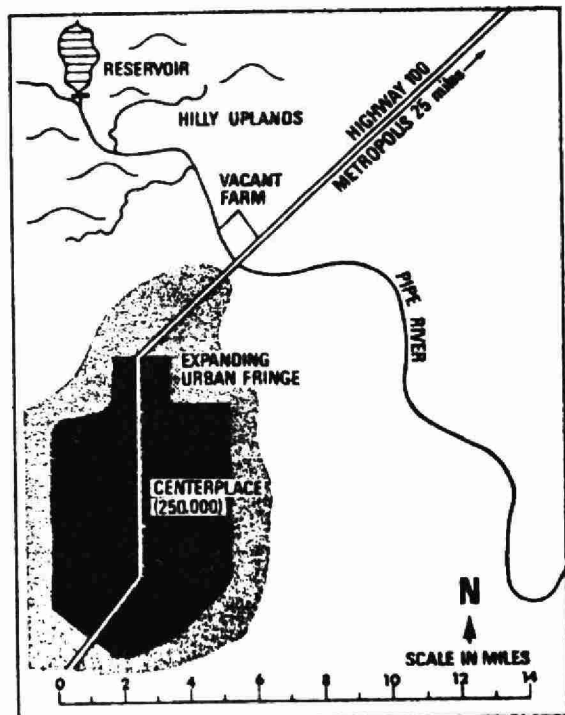
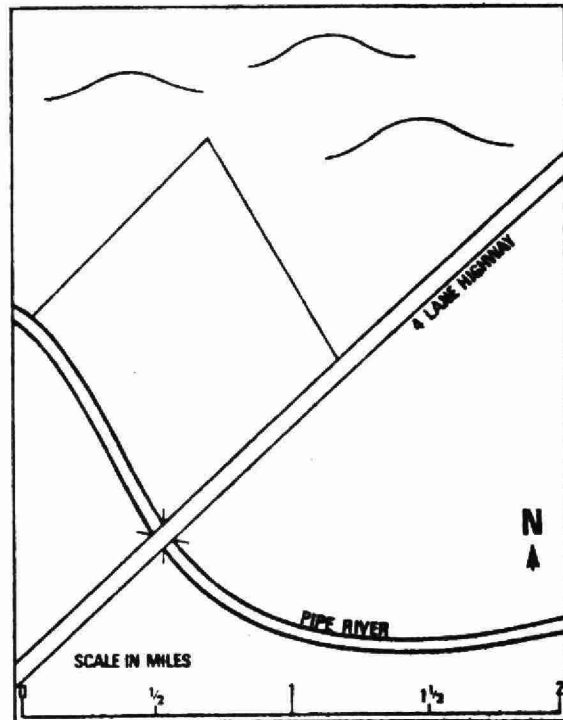
The Pipe River is unpolluted and is the source of irrigation water as well as the municipal water supply.

The river is too small for freight transportation, but logs could be floated on it.

The Regional Municipality adopts land use zoning bylaws subject to the approval of the Ontario Municipal Board, and many citizen's groups are developing to influence zoning decisions.

The present sewage treatment plant and garbage disposal area are at maximum capacity. The citizens of Centerplace are concerned about the maintenance of a scenic regional environment.

List possible uses of the land below:



Questions and discussion:

Note: When most people have started to write down uses on Task A, go ahead with question #1.

1. What are some possible uses for the undeveloped land? As people respond, write all comments on board, just as they say them. Don't paraphrase for them unless they are too wordy, in which case, ask: "How shall I write that on the chart?" If they give major categories right away, like Recreation, or Industry, say, "Can you give me an example of that?" Number the items as you go along—to simplify identification later. When you get 15 or 20 items, STOP.

2. "Which of these uses are similar?" Designate similar uses by letters—A, for all of one type; B, the next, etc. When most are designated with a letter, or the group seems to run out of thoughts, STOP. It's okay to change the groupings if the students change their minds along the way in #2 above.

3. What label could we give to all the items in A? "What label could we give to Group B?", etc., e.g. Recreation, Industrial, Utilities, Housing, Commercial. It's okay if they suggest more than one label for a Group; write them both down.

II. DEVELOPING AND GIVING PRESENTATIONS

1. Divide the class or group into the number of categories decided on in #3. There shouldn't be more than 6–10 in each group. Assign each group to one of the use categories.

2. Each group is to represent the special user group assigned.

3. Pass out TASK B and inform the students they have 10 minutes to list and analyze possible uses for the vacant land in the assigned category. They may consider those listed on the board in their category plus any other possible uses they can think of for the category.

TASK B: (10 minutes) Group # _____ Assigned Category of Land Use _____

Your task is to analyze and list possible consequences of different land uses within your assigned land use category.

<i>Use</i>	<i>Advantages to land/people</i>	<i>Disadvantages to land/people</i>

(At end of 10 minutes go on.)

Discussion:

Tell group: Now go on to TASK C. You have 20 minutes to plan a strategy and develop a 3-minute presentation to be made to the Regional Municipal Council.

- a. This presentation will be a proposal for developing the undeveloped farmland.
- b. You must have a visual display such as a land use map drawing as a part of your presentation.
- c. More than one person in your group must help in making the presentation.

Distribute Task C cards.

TASK C: (20 minutes)

Develop a strategy and method to present your plan of development to the Regional Municipal Council. or appropriate local authorities.

Note: If possible, have a staff person assigned to each group to make written observations about how the group was able to work together to solve the problem.

1. Ten minutes into Task C, have each group select one of its members to meet together as the Regional Municipal Council. Take the Council into another room, and tell them they will be responsible for hearing the presentations and deciding upon the best one. Their job in the next 10 minutes is to:
 - a. Develop the criteria they will use in evaluating the proposals.
 - b. Develop some kind of matrix they can each use while the presentations are being given to record their evaluations.
 - c. Elect a chairman to preside during group presentations.

CRITERIA

<i>Presentation</i>			

2. Twelve minutes after groups start planning TASK C, remind them they have 8 minutes left to have their verbal and visual presentation ready. Let groups have 5 more minutes to finish if needed.
3. Have Regional Municipal Council enter room and sit up front. Appoint a timekeeper to cut all presentations off at 3 minutes (give 2-minute warning). Announce: "Because of time, there will be no rebuttals or discussion." The Council may want to ask questions or have rebuttal time after all presentations. However, allow only 5-10 minutes for this part so it won't get out of hand.
4. After 3 is finished, the Council retires for 5-10 minutes to select the best proposal.
5. While Council is meeting, each small group is to develop a list of criteria they think should be used in choosing between the plans submitted.
6. Regional Municipal Council announces their *decision* and gives reasons why.
7. Regional Municipal Council reads their criteria aloud.

Questions and discussion:

1. Did new leadership emerge during this session? What factors enabled this to happen? Call on staff observers if used.
2. Did your group work as a team? What did your group do to insure participation by all members of group?
3. What happened in the groups? How did you feel as a person? What about the criteria used? How did each observer see the interaction in the groups?
4. What additional data would you have liked to have had for your groups? List on board, e.g.: topography, vegetation, economy of area, railroad, shopping center, adjacent land, climate, soil survey, historical information, flood plain, wildlife, interest of board of control, money available, educational needs, regulations by State, existing zoning, political climate, population information (age needs, race, jobs). What elements in the community discussion might support each interest?

Note: This is one of the most important parts of the activity because it emphasizes that we need a variety of information and data before we can intelligently make a land management or environmental decision to *best* meet the needs of people and their environment. This question list has all the elements that need to be considered in studying a local environmental issue or concern. It also includes elements of all the curriculum subject areas (social studies, science, language, arts, etc.).

III. ANALYZING CHARACTERISTICS OF SIMULATION

Questions and discussion:

1. One group of people working with simulation games has identified at least three basic characteristics of most simulation games:
 - a. There is a problem to be solved.
 - b. The factors affecting the decisions are identifiable.
 - c. Groups or individuals with different interests who will be affected by the decision can be identified.
2. Let's see if the game we just played has these components.
 - a. What was the clearly defined problem in the Land Use Alternatives Simulation?
 - b. What factors influenced the decision in the Land Use Alternatives Simulation?
 - c. We assigned groups to fit each role in the Land Use Alternatives Simulation, but we all helped develop those roles from the items we listed on the chart. What group or individual roles were identified? How were they identified?

IV. DEVELOPING YOUR OWN SIMULATION GAME (OPTIONAL)

Discussion:

The most exciting simulation games are those people develop themselves, based on local environmental issues in their community, or region.

Can you think of some current environmental issues in your community around which you could develop a game? Call for responses.

For the next 30 minutes, you will work with one or two other people, developing the format for a simulation game based on a local land use issue described in a news article. (Have copies of current newspaper article available if students want to use them.) Remember that three basic characteristics of a Simulation Game are:

1. There is a problem to be solved;
2. The factors affecting the decision are identifiable; and
3. Groups and individuals with different interests who will be affected by the decision can be identified.

At the end of that time, we would like to hear from several of you about what you have developed.

Pass out TASK D Cards.

TASK D: (30 minutes)

DEVELOPING A SIMULATION GAME

Work with 1 or 2 other people.

Using a newspaper article about a local environmental land use problem, develop the format of a simulation game, considering the following items:

Identify the problem or issue to be decided upon.

Identify the choices available to the decision-makers.

Identify the factors having an influence on the decision.

Identify individual or group roles.

Identify the factors (for or against) assigned to each role.

Establish conditions for the players (i.e., resources, voting procedures, bargaining money, etc.)

Develop specific goals or objectives for the players.

Include limits or rules for what is permissible behavior (time factor, trading, No. points, money allocations, etc.).

Ask for reports from those who want to share.

Questions and discussion:

1. How can you use the techniques in this session in your job situation? Classroom?
2. How could a game like this develop decision-making skills in environmental management?
3. Have any of you used simulation games? Tell us about your experiences.
4. How can we take this process and use it to involve the public in social and political decision-making action projects in the community?
5. How can we summarize the use of simulation games in studies about the environment?
6. Which of the behavioral outcomes did we accomplish in this discussion? (Read and discuss.)

If the group is interested in further analysis of the elements of simulation use the following:

1. One important characteristic of a simulation is a clearly defined problem, including the choices available to the decision makers.
 - a. How would you formulate the problem or issue you were asked to decide upon?
 - b. Did the developer of this simulation simplify the choices?
 - c. If so, how did he do it?
2. A second major characteristic of educational simulation is the factors having an influence on the decision. Several objective and subjective factors to be considered in making a decision need to be clearly identified. These factors indicate the data that are relevant to each of the possible choices.
 - a. What factors were selected as influences on the decision?
 - b. Which of these factors would you classify as objective?
 - c. Which of these factors would you classify as subjective?
5. A third characteristic of educational simulations is the use of identifiable group or individual roles to present information about the problem and many of the variables in the situation. Also a role can be planned to incorporate a limited number of factors that influence the choice to be made.
 - a. What roles were identified?
 - b. What variables did these roles contribute to the decisions?
 - c. What additional roles could have been identified?

Distribute Task E cards.

TASK E:

Describe how you feel about our session today.

Behavioral Outcomes in Knowledge.

As a result of this session you should be able to:

1. Identify and describe three component parts of simulation games.
2. Construct your own simulation game based on a current environmental issue.
3. Name and describe at least 10 important types of data needed before making a land management decision.
4. Identify cause and effect relationships that exist in environmental management.
5. Describe alternative solutions to solving specific problem.

Behavioral Outcomes in Feelings, Awareness, Values, and Action.

As a result of this session you should be able to:

1. Describe how the information in #3 above affects your life, community, and the management of the environment.
2. Outline a plan of action to affect a solution or partial solution through the social and political decision-making process about the environmental issue you used in developing your own simulation.

Equipment needed

blackboard or easel
chalk or magic markers
newsprint or butcher paper (enough for each group to make visual display)
magic markers (4 colors for each group to make visual display)
masking tape
task cards

The Centerplace City problem has been adapted with permission from the May 1970 Journal of Geography from the article "A Land Use Alternatives Model for Upper Elementary Environmental Education" by Dennis Asmussen and Richard Cole, University of Washington.

References: There are many publications on simulation games. Two that may be of value to you are:

1. Games in Geography, Rex Walford, Longman group limited, London paperback.
 2. Simulation Games for the Social Studies Classroom—from The Foreign Policy Association, 345 East 46th St., New York, N.Y. 10017. Library of Congress #68-24538.
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